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Claims:

1. A method for producing hyperpolarized  $^{129}\text{Xe}$  comprising
  - 5 a) preparing a mixture of xenon, ~~an additive~~ <sup>insert</sup> and a free radical
  - b) hyperpolarizing said mixture according to the DNP method to obtain hyperpolarized  $^{129}\text{Xe}$  and
  - c) optionally separating said xenon from the other components of the mixture.
- 10 2. A method according to claim 1 wherein the additive is <sup>at least one</sup> ~~at least one solvent or a mixture of solvents~~ which has good glass-forming properties and/or lipophilic properties.
- 15 3. A method according to claim 1 <sup>at least one</sup> ~~and 2~~, wherein the ~~additive is a~~ <sup>is</sup> solvent or a mixture of solvents selected from the group consisting of straight chain or branched  $\text{C}_6\text{-C}_{12}$ -alkanes,  $\text{C}_5\text{-C}_{12}$ -cycloalkanes, fatty alcohols, fatty esters, substituted benzene derivatives, mono- or polyfluorinated solvents, single chained alcohols and glycols.
- 20 4. A method according to claims 1 to <sup>2</sup> ~~3~~ wherein the mixture in step a) is prepared from liquid xenon.
- 25 5. A method according to claims 1 to <sup>3</sup> ~~4~~ wherein the mixture in step a) is prepared by condensing xenon gas on the top of <sup>the at least one solvent or mixture of solvents</sup> ~~the additive~~ and the free radical, warming the components until xenon and the additive are in a liquid state and mixing the components until a homogeneous mixture is obtained.
- 30 6. A method according to claims 1 to <sup>4</sup> ~~5~~ wherein in step b)  $^{129}\text{Xe}$  is directly hyperpolarized.
7. A method according to claims 1 to <sup>5</sup> ~~6~~ wherein in step b) the NMR active nuclei of <sup>at least one solvent or mixture of solvents</sup> ~~the additive~~ are hyperpolarized and this polarization is subsequently transferred to  $^{129}\text{Xe}$  by a cross-polarization sequence.

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8. A method according to claims 1 to <sup>6</sup> 13 wherein xenon enriched with  $^{129}\text{Xe}$  is used.
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9. A method according to claims 1 to <sup>7</sup> 8 wherein in step c) xenon is separated from the other components of the mixture by warming the mixture until xenon is in the gas state and collecting said xenon in a suitable container.
- 5  
10. A method for the production of a contrast agent comprising  
a) preparing a mixture of xenon, <sup>an insert</sup> ~~an additive~~ and a free radical  
b) hyperpolarizing said mixture according to the DNP method to obtain  
10 hyperpolarized  $^{129}\text{Xe}$   
c) separating said xenon from the other components of the mixture, and  
d) optionally condensing the separated xenon again.
- 10  
12. Use of DNP - hyperpolarized  $^{129}\text{Xe}$  <sup>produced according to the method of claim 1 to 8</sup> for the manufacture of a contrast agent for  
15 the use in magnetic resonance imaging of the human or non-human animal body, preferably of the lungs of the human or non-human animal body.
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